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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
CHEN, KEATH T	

ART UNIT	PAPER NUMBER
1709	

NOTIFICATION DATE	DELIVERY MODE
07/13/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/781,247	LOKE ET AL.	
	Examiner	Art Unit	
	Keath T. Chen	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 9-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 9-22 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>02/18/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-8, drawn to an apparatus, classified in class 118, subclass 723ME.
- II. Claims 9-22, drawn to a cleaning method, classified in class 134, subclass 1.1.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatus as claimed can be used to practice another and materially different process such as deposition.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

- (a) the inventions have acquired a separate status in the art in view of their different classification;
- (b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation with Katsuhiko Arai by Examiner Bret Chen on June 28, 2007 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: "9" in Fig. 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action

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to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim interpretation

In claim 6: "... a controller which activates the electromagnetic wave generator only for reactor cleaning ...", the last part "only for reactor cleaning" is a functional language, does not add to structural limitation. Any controller that is connected to wave generator meet the claim because it is capable of turning on the wave generator only for reactor cleaning.

In claim 7: "... to an axis of radio-frequency electrodes arranged in the reactor ...", in the cases when there are more than two RF electrodes, any axis of any two RF electrodes will meet the claim. When the reactor chamber wall is a grounded RF electrode, there are multiple axes, any one of these axes will meet the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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2. Claims 1-3 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Stinnett et al. (US 20010003678, hereafter '678).

'678 teaches all limitations of claim 1:

A thin-film deposition system (Fig. 8, capable of deposition) comprising: a plasma CVD reactor (#60); a remote plasma chamber arranged outside the plasma CVD reactor ([0029], lines 11-end, a remote ICP plasma source can be added), for providing active species to an interior of the plasma CVD (remote plasma is to provide ionic gas; the last sentence of [0029] states remote plasma provides equivalent function as anisotropic local plasma such as in [0018] last sentence, which provides reactive ion); and an electromagnetic wave generator (#84) arranged outside the plasma CVD reactor and the remote plasma chamber, for emitting electromagnetic waves to the interior of the reactor ([0028] lines 1-8).

'678 further teaches the limitation of claim 2:

The electromagnetic waves are microwaves ([0028], first sentence).

'678 further teaches the limitation of claim 3:

The reactor and the electromagnetic wave generator are connected by a waveguide (Fig. 1, #86, [0028], first sentence).

'678 further teaches the limitation of claim 8, as discussed in claim 1 rejection:

The remote plasma generates an inductively-coupled plasma.

3. Claims 1 and 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Cox et al. (US 6418874, hereafter '874).

'874 teaches all limitations of claim 1:

A thin-film deposition system (Fig. 1, #10) comprising: a plasma CVD reactor (region enclosed by bottom plate #60 and side wall #14); a remote plasma chamber arranged outside the plasma CVD reactor (#104, col. 6, lines 44-46), for providing active species to an interior of the plasma CVD (col. 6, lines 46-52); and an electromagnetic wave generator (#28, toroidal plasma source) arranged outside the plasma CVD reactor and the remote plasma chamber, for emitting electromagnetic waves to the interior of the reactor (toroidal plasma source is to provide energy to the interior of the reactor).

'874 further teaches the limitation of claim 6:

A controller (#44) which activates the electromagnetic wave generator (through connection of RF generator #20 and leads 24, 26 to ferrite core #22A, col. 10, lines 29-31) only for reactor cleaning (col. 2, lines 26-28, controller is capable for control the generator only for reactor cleaning).

'874 further teaches the limitation of claim 7:

The electromagnetic wave generator (#28) is connected to a side wall (top side of the reaction chamber wall) of the reactor in a direction (vertical direction) perpendicular to an axis (horizontal direction) of radio-frequency electrodes (#74 substrate and #90 ground to the side wall #14, col. 6, lines 13-17) arranged in the reactor.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over '678, further in view of Shang et al. (US 6172322, hereafter '322).

'678 teaches all limitations of claim 1, as discussed above. '678 further teaches that the waveguide is connected to applicator (#74), but is silent on the choice of applicator/window material.

'678 does not explicitly teach the limitation of claim 4:

The reactor comprises a sapphire window where the waveguide is connected.

'322 is an analogous art in the field of plasma assisted chemical reactions (col. 1, lines 13-17), particularly in solving the problem of uniformly distributes the microwaves using waveguide (col. 2, lines 9-11). '322 teaches the connection of waveguide (Fig. 1, #175) and sapphire window (#137) for the purpose of uniformly distribute the microwave energy (col. 3, lines 60-62).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '322 with '678. Specifically, to have utilized a sapphire material as applicator/window (#74) that connected to waveguide (#86) for the

apparatus in Fig. 8, for the purpose of achieving uniform microwave energy distribution, with a reasonable expectation of success.

The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over '678, further in view of Houchin et al. (US 5202095, hereafter '095).

'678 teaches all limitations of claim 1, as discussed above.

'678 does not teach the limitation of claim 5:

The reactor and the electromagnetic wave generator are connected by a co-axial cable.

'095 is an analogous art in the field of plasma processor used in a process of manufacturing semiconductors (field of invention), particularly in solving the problem of plasma processing (col. 1, lines 43-50, '678, field of invention). '095 teaches the use of coaxial cables being more advantageous over the use of waveguides for the purpose of miniaturization.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '095 with '678. Specifically, to have replaced the waveguide (#86) of the apparatus in Fig. 8 of '678 with coaxial cable, for the purpose of miniaturization.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6074514, 5621331, 5812040 and 6026762 are cited for sapphire applicator/window of microwave. US 5082517 is cited for sapphire window and coaxial cable. US 6136387 is cited for providing plasma for cleaning only.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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K.C


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